CLAIMS:

1. A constant velocity universal joint comprising two shafts, one shaft being the input and the other shaft being the output, each shaft having a claw located on one end, the claws being rotatably mounted on first and second hinge elements for rotation about an axis (V, V_1, V_2) which passes through the geometrical centre of the joint (G), and a cage which can reciprocate with respect to the hinge elements in the direction of the hinge axis (H), the cage containing the hinge elements and allowing them to oscillate relative to each other, the hinge axis (H) and the axis of each shaft intersecting at the geometrical centre (G) of the joint, characterised in that the claws have an eccentric cam profile which cooperates with the cage to produce the reciprocation of the cage with respect to the hinge elements whilst ensuring that the hinge axis (H) always lies on the bisecting angle plane between the two shaft axes.

2. A joint as claimed in Claim 1, wherein the claws and cage cooperate such that the claws rotate about the axis (V, V_1, V_2) by an equal and opposite amount relative to the hinge axis (H).

3. A joint as claimed in Claim 1, wherein centring control is provided by the cage which ensures that three degrees of freedom of motion in two planes are accommodated.

4. A joint as claimed in any preceding claim, wherein the cage performs two functions, the first being to hold the two hinge elements together to form the hinge and the second being to provide two face cams which react with the cam profile on the claws.

5. A joint as claimed in Claim 4 wherein the cage performs a third function in that it prevents any relative axial motion between the input and output shafts relative to the geometrical centre (G).

6. A joint as claimed in any preceding claim, wherein the eccentric cam profile of each claw cooperates with the cage to produce reciprocation of the cage with respect to the hinge elements when the claws are rotated about the axis (V, V_1, V_2).

7. A joint as claimed in any preceding claim, wherein the hinge elements each comprise a cross shaft with an integral stub axle which sits in a respective claw.

8. A joint as claimed in Claim 7, wherein each cross shaft is identical in form and has a part cylindrical groove and wherein a pair of centre bearings are seated between the grooves, the cross shafts thereby pivoting on the centre bearings about hinge axis (H).

9. A joint as claimed in Claim 8, wherein the centre bearings prevent any relative axial motion between the cross shafts.

10. A joint as claimed in Claim 7, wherein each cross shaft is identical in form having a part cylindrical recess at one end and an integral centre bearing at the other end, the cross shafts pivoting with respect to each other about the hinge axis (H).

11. A joint as claimed in any preceding claim, wherein the cage comprises two spaced containing rings fixedly connected to each other by projections

which form cross beams between the containing rings and which extend parallel to the hinge axis (H).

12. A joint as claimed in Claim 11, wherein the containing rings can be axially preloaded against the cam profiles to reduce backlash.

13 A joint as claimed in Claim 11, wherein the motion of the containing rings over the surfaces of the cross shafts takes the form of a cylindrical ellipse thus ensuring lubricant flow motion.

14. A joint as claimed in any preceding claim, further comprising a slipper element which sits between the cooperating surfaces of a claw and the cage to increase the surface area of contact.

15. A joint as claimed in Claim 14, wherein the slipper element can pivot about a point which passes through the centre of the cam profile of the claw.

16 A joint as claimed in Claim 14 or Claim 15, wherein a tongue is provided on each slipper element which cooperates with an arcuate slot in a cross shaft to prevent tilting of the slipper element.

17. A joint as claimed in any preceding claim, wherein each claw further comprises a preloading means to reduce backlash.

18. A joint as claimed in Claim 17, as dependent on any of Claims 14 to 16, wherein the preloading means is a preloading plate to which the slipper element is pivotally connected.

19 A joint as claimed in Claim 18, wherein the first and second hinge elements are fixedly secured to the preloading plate on a respective claw such that the claws can rotate about the axis (V, V_1, V_2) with respect to the hinge elements and preloading plates.

20. A joint as claimed in Claim 14, wherein a centring mechanism is formed comprising the face cams on the cage, the slipper elements and the cam profile on each claw.

21. A joint as claimed in Claim 20, wherein the centring mechanism enables a secondary force, produced as a result of the torque passing through the joint when articulated in the plane at right angles to the axes of the cross shafts, to pass over the sliding external surfaces of the joint.

22. A joint as claimed in any of Claims 1 to 7, wherein the cage comprises two spaced containing rings fixedly connected to each other by a central cross beam which extends along and parallel to the hinge axis (H), the cross shafts pivoting with respect to each other about the central cross beam which also acts as the centre bearing.

23. A joint as claimed in Claim 22, wherein each cross shaft is identical in form and has a part cylindrical centrally located recess in which a cylindrical ring lock sits, the ring lock being slidable on the central cross beam whilst locking together the cross shafts to prevent any relative axial motion between the cross shafts and being free to rotate relative to the cross shafts.

24. A joint as claimed in Claim 22 or Claim 23, wherein each containing ring is screw threaded onto one end of the central cross beam.

25. A joint as claimed in any of Claims 22 to 24, further comprising a slipper element which sits between the cooperating surfaces of a claw and the cage to increase the surface area of contact.

26. A joint as claimed in Claim 25, wherein the slipper element pivots about a point which passes through the centre of the cam profile of the claw.

27. A joint as claimed in any of Claims 22 to 26, wherein each claw further comprises preloading means to reduce backlash.

28. A joint as claimed in Claim 27, as dependent on Claim 7, wherein the preloading means are crossed roller bearings located between the stub axle and the inside surface of the claw.

29. A joint as claimed in Claim 25 or Claim 26, wherein the containing rings are preloaded against the slipper elements and the slipper elements are preloaded against the cam profiles by means of the screw threads between the containing rings and the central cross beam.

30. A joint as claimed in any of Claims 22 to 29, wherein the motion of the containing rings over the surfaces of the cross shafts takes the form of a cylindrical ellipse thus ensuring lubricant flow motion.

31. A joint as claimed in any of Claims 22 to 30, wherein the motion of the cross shafts over the surface of the central cross beam takes the form of a cylindrical ellipse thus ensuring lubricant flow motion.

32. A joint as claimed in Claim 25, wherein a centring mechanism is formed comprising the face cams on the cage, the slipper elements and the cam profile on each claw.

33. A joint as claimed in Claim 32 wherein the centring mechanism enables a secondary force, produced as a result of the torque passing through the joint when articulated in a plane at right angles to the axes of the cross shafts, to pass over the sliding external surfaces of the joint.

34. A constant velocity joint substantially as herein described with reference to Figures 1 to 38.